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SUMMARY

In 1997 monitoring of migratory landbirds continued for the sixth year at the Creamer's Refuge migration station in a cooperative project with the Alaska Bird Observatory. Mist nets were used to capture birds on 42 days between 25 April and 14 June and 66 days between 15 July and 30 September. A new standard array of nets was established in 1997 using a subset of previous years' nets to reduce variations in net effort. Comparisons of capture rates in the original and reduced set with data from fall 1994-1996 found no significant differences. Spring 1997 capture rates (4.3 birds/100 net hours; 354 birds captured) were low, comparable to 1993, the previous low year. Fall 1997 capture rates (33.4 birds/100 net hr; 4890 birds captured) were the second highest recorded since netting began in 1992. Most birds captured (83% 93% of individuals and 71%-81% of species) in both spring and fall were neotropical migrants. In spring the most commonly captured species were the yellow-rumped (myrtle) warbler, American robin, dark-eyed (slate-colored) junco, Swainson's thrush, northern waterthrush and orange-crowned warbler. In fall, the yellow-rumped (myrtle) warbler, American tree sparrow, orange-crowned warbler, dark-eyed (slate-colored) junco, Lincoln's sparrow, ruby-crowned kinglet, yellow warbler, Swainson's thrush and Wilson's warbler were most common. The proportion of juveniles (hatch-year birds) in the fall captures was 0.89, slightly higher than average.

Key words: Alaska, migration monitoring, mist netting, neotropical migratory birds.

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BACKGROUND

Declines in populations of migrant landbirds have been well documented in North America. Long distance migrants, including flycatchers, thrushes, and wood warblers that breed in North America and winter in neotropical Central and South America, are among the species of concern (Askins et al. 1990; Sauer and Droege 1992). Alaska is an important part of the breeding range of several species of boreal forest landbirds known to be declining in other portions of their North American breeding range.

A concerted international conservation effort, *Partners In Flight* Neotropical Migratory Bird Conservation Program, was developed in the early 1990s to address this problem. In Alaska, the *Boreal Partners in Flight* working group provides coordination and direction for local projects so that a comprehensive statewide monitoring and research program can be formed from the individual efforts of the many partners.

The Creamer's Refuge migration station is operated by the Alaska Bird Observatory in cooperation with ADF&G and a host of other contributors. The migration station is part of the statewide monitoring network, providing information on abundance and productivity on a broad scale to complement Breeding Bird Survey, off-road point counts, and MAPS

(Monitoring Avian Productivity and Survival) studies. Approximately 150 migration monitoring sites are located throughout North America. Creamer's is the northernmost migration monitoring station and the longest-running station in Alaska.

OBJECTIVE

- Gather information on the abundance and productivity of migratory songbirds as part of a long-term monitoring project in the boreal forest of central Alaska.

STUDY AREA

The migration station is located on Creamer's Field Migratory Waterfowl Refuge in Fairbanks and encompasses about 15 ha of boreal forest, shrub, and wetland habitats.

METHODS

An array of mist nets was used to capture birds. Nets were opened about 7 hours each day, from sunrise to early afternoon, weather permitting. The spring 1997 netting season extended from 25 April to 14 June, and fall season 15 July to 30 September. In the first 5 years of this project, 4 to 51 nets were operated daily at the station. In 1997 a standard array of mist nets was established using a subset of previous years' nets so that all nets could be operated consistently, regardless of bird abundance or number of staff available. This reduced set of nets will be the standard array operated in future years. To examine the effect this change in nets might have on capture rates, we used data collected in fall 1994 to 1996 to compare total captures in all nets used those years to the number caught in the reduced set of nets in use those same years. Birds were banded with standard aluminum leg bands, and we collected data on age, sex, wing chord, tail length, fat index, breeding condition, and molt.

We also provided public education programs at the banding station. A 3045 minute banding demonstration with information about bird migration, biology, and conservation was provided to 23 classes of local school children each school day in May and September. Structured programs were also provided to groups from summer science camps and tours. We supplied scheduled visitors with activity guides and individual booklets before their visit to the banding station. Impromptu presentations were provided to unscheduled drop-in visitors.

RESULTS

SPRING 1997

Twenty-six nets were operated on 42 days in spring 1997 for a total of 7548 net hours, down 36% from the average netting effort of the previous 4 years (Table 1). Three hundred fifty-four individual birds were captured, representing 27 species (Table 2). This was the lowest absolute number of birds captured in the 6 years of spring netting, but the capture rate of 4.3 birds per 100 net hours was equivalent to 1993 and only slightly lower than 1995 and 1996 (Table 3). As in previous springs, most species and individuals captured were neotropical migrants; 81% of the species were Type A (44%; species wintering primarily south of the US/Mexico border)

or Type B (37%; species with some populations wintering south of the US/Mexico border). Individuals captured comprised 93% Type A (38%) or Type B (55%).

Among the 16 most commonly captured species, the American robin was captured in spring 1997 at the highest rates ever recorded for the species in the 6 years of netting, and the gray-cheeked thrush was captured at the lowest rates (Table 3). When 1997 capture rates for these 16 species are compared with the average rate of capture for the first 5 years (1992-1996), 9 species were captured less frequently than the previous 5-year average and just 4 were captured at rates greater than the average. Three species were captured at rates in spring 1997 nearly equal to their 5-year average.

FALL 1997

In fall 1997 nets were operated for 66 days for a total of 14,617 net hours. The reduction in nets to 30 from a maximum of 51 in prior years was not accompanied by a decline in net hours because in previous years it was common to open only a portion of the total number of nets on a given day and nets were usually operated for approximately 10 fewer days than in 1997 (Table 1). A total of 4890 individual birds were captured in fall 1997, including 35 species. The overall capture rate of 33.4 birds/100 net hours was the second highest recorded in the 6 years of fall netting, exceeding the average rate (27.7) for the first 5 years. Most (71%) species captured were Type A (40%) or Type B (31%) neotropical migrants, as were most (83%) individuals (Type A, 38%; Type B, 45%).

Among the 19 commonly captured species, 4 (alder flycatcher, Swainson's thrush, American robin, and fox sparrow) were captured at the highest rates recorded in the 6 years of fall netting, and no species set a new minimum record (Table 4). Thirteen species were caught at higher rates than their 1992-1996 average, 3 were captured at lower rates than average, and 3 were captured at average rates.

In fall 1997, 89% of birds captured were young of the year (HY, hatch year) (Table 5). This falls within the range (84-90%) observed in 4 of 5 previous years, excluding the exceptionally low (75%) year of 1993. The proportion of young in 3 of the most commonly captured species, Wilson's warbler, American tree sparrow, and white-crowned (Gambell's) sparrow was higher in 1997 than in any prior year, while a new low was recorded for only 1 species, the Fox sparrow.

The effect of reducing the overall number of nets was examined using data from fall 1994 to 1996 by comparing the capture rates using all nets with capture rates in the reduced set of 30 nets now used as the standard array (Table 6). The absolute difference in capture rates between the full and reduced arrays for the 19 most common species averaged 8% to 9% for the 3 years. There was no significant difference between capture rates using the full and reduced set of nets (paired-sample *t*-tests; 1994, $t = -1.49$, $df = 18$, $P > 0.15$; 1995, $t = -1.85$, $df = 18$, $P > 0.05$; 1996, $t = -0.91$, $df = 18$, $P > 0.35$). Only 3 of 19 species had average absolute

the only species captured at rates averaging >10% higher in the reduced set, and only the Savannah sparrow was captured an average of >10% less in the reduced set of nets. Overall, 7

species were captured at higher rates (\bar{x} difference = +10%) in the reduced set of nets all 3 years, while 3 species were consistently caught at lower rates (\bar{x} difference = -8%) and capture rates for 9 species were not consistently higher or lower (\bar{x} absolute difference = 7%).

EDUCATION

The number of participants in banding demonstrations more than doubled from 1996 to 1997. In 1997, 95 groups with 2237 individuals (primarily school classes) attended educational programs at Creamer's Refuge (Table 7). More than 1900 activity booklets were distributed to these groups prior to their arrival at the station. Another 400 unscheduled individuals received informal presentations at the banding station.

CONCLUSIONS AND RECOMMENDATIONS

This year was the seventh year of the long-term monitoring effort at Creamer's Refuge. This cooperative project conducted by the Alaska Bird Observatory has proven capable of sustaining the consistent effort necessary to maintain a project requiring 15-20 years or more of data collection. Recent analyses and reviews have confirmed the usefulness of standardized netting stations for study of the abundance and productivity of migratory bird populations (Dunn and Hussell 1995; Johnson and Geupel 1996; Dunn et al. 1997). In addition to its value in monitoring species of concern, this project is also gathering important information on the timing of migration, reproduction, molt, juvenile dispersal, changes in body condition, and other life history events and has become a significant educational opportunity for Fairbanks school children and others.

ACKNOWLEDGMENTS

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The dedicated board of directors and staff of the Alaska Bird Observatory are responsible for the success of this long-term project. I would especially like to thank Lori Quakenbush, Board President; Anna-Marie Barber, Chief Biologist; Nancy DeWitt, Executive Director; Steve Springer, Banding Biologist; and Sara McDaniel, Education Coordinator for the key roles they played in this effort. Thanks also to the interns and volunteers who regularly got up before dawn to run the nets. Mark Ross, ADF&G, assisted with materials for the banding demonstrations and developed complementary educational programs for visiting school children.

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Table 1 Mist netting effort at Creamer's Refuge migration station, 1992-1997

Season	Description	Year					
		1992	1993	1994	1995	1996	1997
Spring	Number of days nets open	42	43	41	45	44	42
	Net hours	6903	10,552	11,252	12,731	12,411	7548
	Number of nets per day (range)	16-29	16-33	27-47	36-47	33-45	26
Fall	Number of days nets open	46	53	52	58	57	66
	Net hours	5,890	13,711	13,934	14,156	14,985	14,617
	Number of nets per day (range)	4-35	11-47	21-51	16-49	18-49	30

Table 2 Numbers of birds captured at Creamer's Refuge migration station, 1997

Species	Winter ^a	Spring 1997	Fall 1997
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	B	1	4
American Kestrel (<i>Falco sparverius</i>)	N		1
Lesser Yellowlegs (<i>Tringa flavipes</i>)	A	1	
Solitary Sandpiper (<i>Tringa solitaria</i>)	A	4	
Downy Woodpecker (<i>Picoides pubescens</i>)	R	1	1
Hairy Woodpecker (<i>Picoides villosus</i>)	R		1
Northern Flicker (<i>Colaptes auratus</i>)	B	3	2
Western Wood-Pewee (<i>Contopus sordidulus</i>)	A		3
Yellow-bellied Flycatcher (<i>Empidonax flaviventris</i>)	A		2
Alder Flycatcher (<i>Empidonax alnorum</i>)	A	3	126
Hammond's Flycatcher (<i>Empidonax hammondi</i>)	A	16	74
Gray Jay (<i>Perisoreus canadensis</i>)	R	1	
Tree Swallow (<i>Tachycineta bicolor</i>)	B		1
Cliff Swallow (<i>Hirundo pyrrhonota</i>)	A		1
Black-capped Chickadee (<i>Poecile atricapillus</i>)	R	5	35
Boreal Chickadee (<i>Poecile hudsonicus</i>)	R		6
Ruby-crowned Kinglet (<i>Regulus calendula</i>)	B	3	197
Arctic Warbler (<i>Phylloscopus sibilatrix</i>)	P		5
Gray-cheeked Thrush (<i>Catharus minimus</i>)	A	5	41
Swainson's Thrush (<i>Catharus ustulatus</i>)	A	28	188
Hermit Thrush (<i>Catharus guttatus</i>)	B	1	18
American Robin (<i>Turdus migratorius</i>)	B	43	39
Varied Thrush (<i>Ixoreus naevius</i>)	N		6
Orange-crowned Warbler (<i>Vermivora celata</i>)	A	20	646
Yellow Warbler (<i>Dendroica petechia</i>)	A	10	189
Yellow-rumped Warbler (<i>Dendroica coronata</i>)	B	74	1234
Townsend's Warbler (<i>Dendroica townsendi</i>)	A		10
Blackpoll Warbler (<i>Dendroica striata</i>)	A	3	102
Northern Waterthrush (<i>Seiurus noveboracensis</i>)	A	25	49
Wilson's Warbler (<i>Wilsonia pusilla</i>)	A	13	186
American Tree Sparrow (<i>Spizella arborea</i>)	N	1	763
Savannah Sparrow (<i>Passerculus sandwichensis</i>)	B	17	106
Fox Sparrow (<i>Passerella iliaca</i>)	B	2	66
Lincoln's Sparrow (<i>Melospiza lincolnii</i>)	A	8	246

Species	Winter ^a	Spring 1997	Fall 1997
White-crowned Sparrow (<i>Zonotrichia leucophrys</i>)	B	13	70
Dark-eyed Junco (<i>Junco hyemalis</i>)	B	37	466
Rusty Blackbird (<i>Euphagus carolinus</i>)	N		1
Common Redpoll (<i>Carduelis flammea</i>)	N	15	5
Totals		354	4890
Dates nets open		25 Apr14 Jun	15 Jul30 Sep
Number of days nets operated		42	66
Number of net hours		7548	14,617

^a Winter range/migration: A = primarily south of US/Mexico border; B = some populations south of US/Mexico border; P = Pacific/Eurasia/Africa; N = North America; R = Resident.

Table 3 Capture rates (birds/100 net hr) of common species and total for all species, Creamer's Refuge migration station, spring 1997

Species	1992	1993	1994	1995	1996	1997
Hammond's Flycatcher	0.17	0.12	0.14	0.17	0.06	0.12
Ruby-crowned Kinglet	0.29	0.01	0.04	0.05	0.06	0.04
Gray-cheeked Thrush	0.23	0.13	0.19	0.09	0.18	0.07
Swainson's Thrush	0.41	0.45	0.49	0.38	0.63	0.33
American Robin	0.45	0.34	0.28	0.35	0.29	0.50
Orange-crowned Warbler	0.58	0.47	0.40	0.36	0.24	0.25
Yellow Warbler	0.67	0.26	0.36	0.06	0.17	0.13
Yellow-rumped Warbler	1.58	0.93	0.48	0.70	0.65	0.94
Northern Waterthrush	0.33	0.13	0.58	0.19	0.44	0.32
Wilson's Warbler	0.48	0.51	0.51	0.46	0.14	0.17
American Tree Sparrow	0.51	0.01	0.08	0.07	0.19	0.01
Savannah Sparrow	0.83	0.14	0.29	0.25	0.42	0.20
Lincoln's Sparrow	0.09	0.05	0.11	0.16	0.10	0.11
White-crowned Sparrow	0.20	0.08	0.16	0.08	0.07	0.17
Dark-eyed Junco	0.42	0.09	0.21	0.29	0.73	0.45
Common Redpoll	1.17	0.18	1.99	0.68	0.08	0.20
Total (all species)	10.46	4.27	6.91	4.63	4.87	4.29

Table 4 Capture rates (birds/100 net hr) of common species and total for all species, Creamer's Refuge migration station, fall 1997

Species	1992	1993	1994	1995	1996	1997
Alder Flycatcher	0.58	0.55	0.44	0.47	0.48	0.86
Hammond's Flycatcher	0.14	0.10	0.29	0.35	0.59	0.50
Black-capped Chickadee	0.58	0.18	0.21	0.48	0.31	0.23
Ruby-crowned Kinglet	0.88	0.65	0.91	0.87	1.56	1.36
Gray-cheeked Thrush	0.63	0.18	0.20	0.35	0.11	0.28
Swainson's Thrush	1.06	0.67	0.73	1.24	0.59	1.29
American Robin	2.73	0.15	0.27	0.24	0.24	0.27
Orange-crowned Warbler	7.35	1.71	4.23	6.12	3.06	4.41
Yellow Warbler	2.17	0.43	0.64	1.38	0.76	1.29
Yellow-rumped Warbler	13.40	0.41	7.18	4.15	7.77	8.44
Blackpoll Warbler	1.38	0.15	0.35	0.36	0.33	0.70
Northern Waterthrush	0.69	0.22	0.12	0.20	0.22	0.36
Wilson's Warbler	2.15	0.79	0.83	1.19	0.50	1.27
American Tree Sparrow	1.81	2.88	2.46	4.66	1.83	5.22
Savannah Sparrow	0.75	0.52	0.20	1.23	0.55	0.72
Fox Sparrow	0.26	0.23	0.30	0.23	0.25	0.45
Lincoln's Sparrow	2.73	1.09	1.27	2.56	1.56	1.68
White-crowned Sparrow	0.69	0.31	0.43	0.30	0.80	0.48
Dark-eyed Junco	2.33	1.18	3.84	2.92	3.86	3.17
Total (all species)	43.16	12.58	25.32	30.78	26.73	33.41

Table 5 Proportion of juvenile (HY) birds in total captures of common species and for all individuals, Creamer's Refuge migration station, fall 1997

Species	1992	1993	1994	1995	1996	1997
Alder Flycatcher	0.89	0.61	0.76	0.64	0.72	0.68
Hammond's Flycatcher	0.89	0.85	0.76	0.96	0.89	0.90
Black-capped Chickadee	0.94	0.75	0.69	0.90	0.93	0.94
Ruby-crowned Kinglet	0.82	0.90	0.89	0.91	0.87	0.87
Gray-cheeked Thrush	0.79	0.76	0.75	0.78	0.88	0.76
Swainson's Thrush	0.82	0.79	0.86	0.91	0.96	0.90
American Robin	0.42	0.50	0.89	0.76	0.86	0.85
Orange-crowned Warbler	0.83	0.63	0.86	0.86	0.84	0.79
Yellow Warbler	0.91	0.58	0.88	0.84	0.94	0.94
Yellow-rumped Warbler	0.91	0.75	0.94	0.91	0.95	0.94
Blackpoll Warbler	0.94	0.71	0.86	0.94	0.96	0.92
Northern Waterthrush	0.93	0.87	0.94	0.93	0.97	0.90
Wilson's Warbler	0.90	0.67	0.84	0.89	0.85	0.96
American Tree Sparrow	0.67	0.72	0.87	0.81	0.85	0.90
Savannah Sparrow	0.87	0.92	0.96	0.96	0.98	0.92
Fox Sparrow	0.69	0.77	0.79	0.81	0.78	0.68
Lincoln's Sparrow	0.92	0.79	0.93	0.95	0.97	0.93
White-crowned Sparrow	0.86	0.90	0.90	0.91	0.93	0.94
Dark-eyed Junco	0.84	0.88	0.96	0.90	0.91	0.89
Total (all individuals captured)	0.84	0.75	0.90	0.87	0.90	0.89

Table 6 Difference in fall capture rates using all nets and reduced set of 30 nets (used in 1997)

Species	Difference		
	1994	1995	1996
Alder Flycatcher	-0.14	-0.13	0.00
Hammond's Flycatcher	-0.10	-0.03	-0.03
Black-capped Chickadee	-0.10	0.04	-0.16
Ruby-crowned Kinglet	0.04	0.15	0.11
Gray-cheeked Thrush	0.10	0.06	0.00
Swainson's Thrush	0.01	0.02	-0.17
American Robin	0.00	0.04	-0.04
Orange-crowned Warbler	0.08	0.10	0.06
Yellow Warbler	0.03	-0.04	0.13
Yellow-rumped Warbler	0.05	0.07	0.13
Blackpoll Warbler	0.17	0.19	0.18
Northern Waterthrush	-0.08	-0.10	0.00
Wilson's Warbler	0.16	0.16	0.08
American Tree Sparrow	0.03	0.12	-0.15
Savannah Sparrow	-0.25	-0.11	-0.11
Fox Sparrow	0.03	0.04	0.08
Lincoln's Sparrow	0.09	0.07	0.08
White-crowned Sparrow	0.07	-0.17	0.01
Dark-eyed Junco	-0.05	-0.04	-0.04
\bar{x} Absolute Difference	0.08	0.09	0.08
Paired-sampled <i>t</i> -test	$P > 0.15$	$P > 0.05$	$P > 0.35$

Table 7 Educational programs and visitors, Creamer's Refuge banding station, 1997

Season	Number of groups	Number of individuals in groups	Number of drop-in visitors
Spring	39	939	
Summer	17	294	400
Fall	39	1004	
Totals	95	2237	400